MARINE DESIGN

Semester V

Part-A

1. What are the stages of ship design?
2. Write down the four stages of ship design process.
3. What is design integration?
4. What makes a good design great?
5. What is mission requirement?
6. What are the owner’s requirements in a new design process of a ship?
7. How to identify mission requirements?
8. What do you mean by ship dismantling?
9. What are the different phases in design spiral?
10. What is “nesting”?
11. What are the marine activities which are taking place in the recent marine industries?
12. What are the different types of cargo that are transporting through sea ways?
13. What is the difference between VLCC and ULCC as deadweight id concern?
14. What is difference between TUE and FEU?
15. Explain the function of a dredger.
16. Find out the present value of future amount of Rs 1000 in 3 years at an interest rate of 10%.
17. What is amount of interest and rate of interest?
18. A person deposited Rs.1,00,000 in a bank for one year and got Rs.1,10,000 at the end of one year. Find out the total amount of interest and the rate of interest per year on the deposited money.
19. What is NPVI?
20. What is AAC?
21. What is MARR?
22. What are the different costs included in Daily running cost and Voyage cost?
23. What is Time charter?
24. What is voyage charter?
25. Write down the dead weight governing equation.
26. What is displacement? How to convert volume displacement to weight displacement?
27. What is displacement coefficient?
28. For a new design, a ship owner has specified of 9000 tonnes. Information from data base of previously built similar ships suggests CD to be 0.715. Estimate the fully loaded displacement (∆) and the lightweight for the new ship.
29. What do you mean by displacement? What is displacement coefficient?
30. Give examples of Type A and Type B Freeboard.
31. What are the advantages of putting bulbous bow in a merchant ship?
32. What is stowage factor?
33. What is superstructure of a ship?
34. What is deckhouse of a ship?
35. What is the normal frame spacing taken for longitudinal and transverse framing system as per rules?
36. What are the transverse bulkheads are to be must fitted in all kinds’ ship?
37. What is the importance of collision bulkheads?
38. What do you mean by cofferdam?
39. With the help of sketch show the location of engine room in a bulk carrier.
40. Why is it necessary to provide ballast tanks in a ship?
41. What is a collision bulkhead?
42. What is the proper location for D.O and H.F.O tanks and why?
43. Differentiate between lightship weight and deadweight.
44. What are the different types of shaft sealing arrangement in the stern tube?
45. Name the different types of anchors used in ships.
46. Name the different portable fire extinguisher.
47. What are the different types of fixed fire fighting systems used in the ships? Name it.
48. Name the different life saving appliances.
49. What is the importance of providing bilge system in a ship?
50. What is the necessity of providing ballast system in a ship?

Part- B

1. Design is a creative and iterative process. Explain.
2. What is the importance of innovation in ship design process?
3. In a new building process of a ship, what are the steps of the commercial process of the ship owner?
4. Speed and deadweight are two guaranteed items. Explain.
5. How do you identify mission requirements? Explain.
6. Explain the different stages of ship life cycle.
7. What is detail design? Explain.
8. What is concept design stage in a ship design process?
9. What are the canal restrictions for Panama Canal, Suez Canal, St. Lawrence Seaway and Kiel Canal?
10. Classify the different types of ship.
11. What is “angle of repose” in a bulk carrier?
12. What is OBO? What is the purpose of OBO?
13. What are the standard containers sizes that are used for container ship?
14. What is the function of offshore supply vessel?
15. A person has taken a loan of amount of Rs.10,000 from a bank for a period of 5 years. Estimate the amount of money, the person will repay to the bank at the end of 5 years for the following cases;
    1. Considering simple interest rate of 8% per year
    2. Considering compound interest rate of 8% per year.
16. What is Required Freight Rate?
17. What are the different cost components in ship operation?
18. Explain different types of chartered ships.
19. What is the difference between Time charter and bare boat charter?
20. Differentiate between deadweight carrier and capacity carrier with respective governing equations.
21. Write down the governing equation for capacity carrier with terminologies involved in it.
22. Give an overview of general process of ship design.
23. Write down the volume equation and weight equation.
24. What do you mean by Type-A and Type-B freeboard? Which of the following two ships of the same length has a higher freeboard – general cargo ship, crude oil tanker?
25. What are the different shapes of bulbous bow? Explain with sketches.
26. What is stowage factor? Explain with some examples of stowage factors for several types of cargo.
27. What is the difference between superstructure and deck house?
28. Explain the different sterns for cargo ships? Explain with sketches.
29. Explain the different stem forms for cargo ships?
30. How does the bulbous bow affect the resistance of a ship?
31. Explain the consideration for allocation space for fuel oil tank in a merchant ship.
32. What are the transverse bulkheads are to be must fitted in all kinds’ ship? Explain with sketches.
33. Explain the consideration for allocation space for ballast tank and fresh water tank in a merchant ship.
34. Where collision bulkhead should be placed as per the rule?
35. For ship without longitudinal bulkheads in the cargo region transverse watertight bulkheads are to be fitted so that, what should be the minimum number total bulkheads in a ship as per the rules.
36. Explain fuel oil tank arrangement in a bulk carrier?
37. Explain about stern gear arrangement.
38. What is the difference between doublers plate and insert plate? Explain with neat sketches.
39. Draw the schematic diagram of ballast system in a ship.
40. Explain fixed CO2 fire fighting system.

Part- C

1. What do you understand by design spiral? Explain various stages of design with the help of this spiral?
2. Draw the flow chart of design activity. Explain the different processes involved in the design activity.
3. Draw the mid-ship section for the following types of vessel,
   1. Oil Tanker
   2. Bulk Carrier
4. Explain different transportation of cargo in the marine industries.
5. (a) What time value of money? What do you understand by cash flow diagram, explain with an example?

(b) Suppose in a project, the data given as:

Initial Outlay = Rs 12,00,000

Annual Revenue = Rs 4,00,000

Life = 10 years

Interest rate = 20% (compounded annually)

1. Draw cash flow diagram
2. Find out present value (or PW) of the project
3. Decide whether this project is acceptable or not
4. There are two design alternatives available in the market for a bulk carrier. Decide which will be a better one as per cost is concern.

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|  | **Design-1** | **Design-2** |
| Ship acquisition cost | **£ 3,00,000** | **£ 2,00,000** |
| Annual operating & maintenance cost | **£ 20,000** | **£ 35,000** |
| Expected salvage value | **£ 1,25,000** | **£ 70,000** |
| Annual Revenue | **£ 50,000** | **£ 45,000** |
| Useful life | 5 years | 5 years |

1. Evaluate the alternatives by PW method at i= 10%
2. Evaluate the alternatives by FW method at i= 10%
3. A ship owner is planning to invest £800000 for the purchase of a Bulk Carrier which will generate a net profit of £140000 per year after deducting the annual operating and maintenance cost. The useful life of the equipment is 10 years and the expected salvage value of the equipment at the end of 10 years is £200000. Compute the Internal rate of return based on present worth, if the ship's minimum attractive rate of return (MARR) is 10% per year.
4. (a) In a new diesel propelled bulk carrier, fitting of an exhaust-gas waste-heat generating plant to provide electrical power at sea is estimated to cost US$ 300,000 more than the equivalent system using only diesel alternators. The equipment reduces auxiliary fuel by 1.0 tonnes per day at sea, with fuel assumed to cost US$ 200 per tonne. If the ship operator expects the ship to spend 230 days at sea a year, and is looking for a rate of return over the 16 year life of the ship of at least 11% on the extra capital, does the equipment look a good investment ? As a first approximation, it may be assumed that the differences in maintenance costs, weight and space are negligible.

(b) What is the actual rate of return from the following investment?

1. (a) A ship owner buys a 200,000 tonne dwt bulk carrier for 30 million Pound cash (i.e. no loans or taxes). He is offered a 15 year time charter by a steel company. What is the minimum hire per tonne deadweight per month he would accept to obtain at least 10% rate of return? Assume months trading per annum. An assumed annual running cost is £ 200, 0000.
2. Write short notes on:
   1. Net Present Value
   2. Required freight Rate
   3. Internal rate of return
3. What are the costs involved in the ship operating economics? What are the different chartered ships in the freight market? How the chartered ships are different from owner operated ships, explain in prospects of cost involves in ship operation.
4. Write short notes on the following:
   1. Chartered ships
   2. Owner operated ships
5. With help of simple sketches describe the procedure for development of lines plan using the form parameter approach at initial design stage.
6. What are the different stem and stern shapes of a ship adopted during the development of a hull form? What are the different shapes of bulbous bow and what are the advantages of bulbous bow?
7. After fixing the main particulars of the design ship what are the alternative methods available for lines plan generation? Write the steps of “form parameter approach” whereby a faired lines plan can be obtained subsequent to the finalization of the main particulars.
8. Explain design considerations which must be taken into account while allotting frame spacing, number of bulkheads and the subdivision of a ship according to rules with the help of a sketch with explanation.
9. Explain design considerations which must be taken into account while allotting space for tanks and location of engine room in a bulk carrier of length 200m and above, according to rules with the help of a sketch?
10. What is Ballast system in a ship? What is the need of ballast system in a ship? Explain the ballast system with a neat schematic diagram.
11. Explain the Bilge system with a schematic diagram.
12. What are the different fire fighting systems? Explain any one briefly from fixed fire fighting system.
13. What are the different portable fire extinguishers? Explain briefly with sketches.
14. Explain about the life saving appliances.
15. Explain the different types of anchors used in ships.